



Taking Virtual Product Development to the Next Level for the Boeing 7E7 Dreamliner

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7E7 Program*



7E7

Boeing 7E7 Dreamliner

- ◆ **200-250 passengers**
- ◆ **747/777 speed and range capability**
- ◆ **2,000-3,000 units required over next 20 years**
- ◆ **Improved passenger experience**
- ◆ **Designed for the environment**
- ◆ **20% more fuel efficient**



Fuel Efficiency Breakthrough

Increasing Reward

Fuel consumption per seat

10%

Current Twins

Current Quads

7E7

Decreasing Risk

- Advanced Materials
- Advanced Systems
- Advanced Aerodynamics
- Advanced Engines

- 3,000 nmi trip
- Three-class seating

Fuel consumption per trip

A New Flying Sensation

◆ Design features:

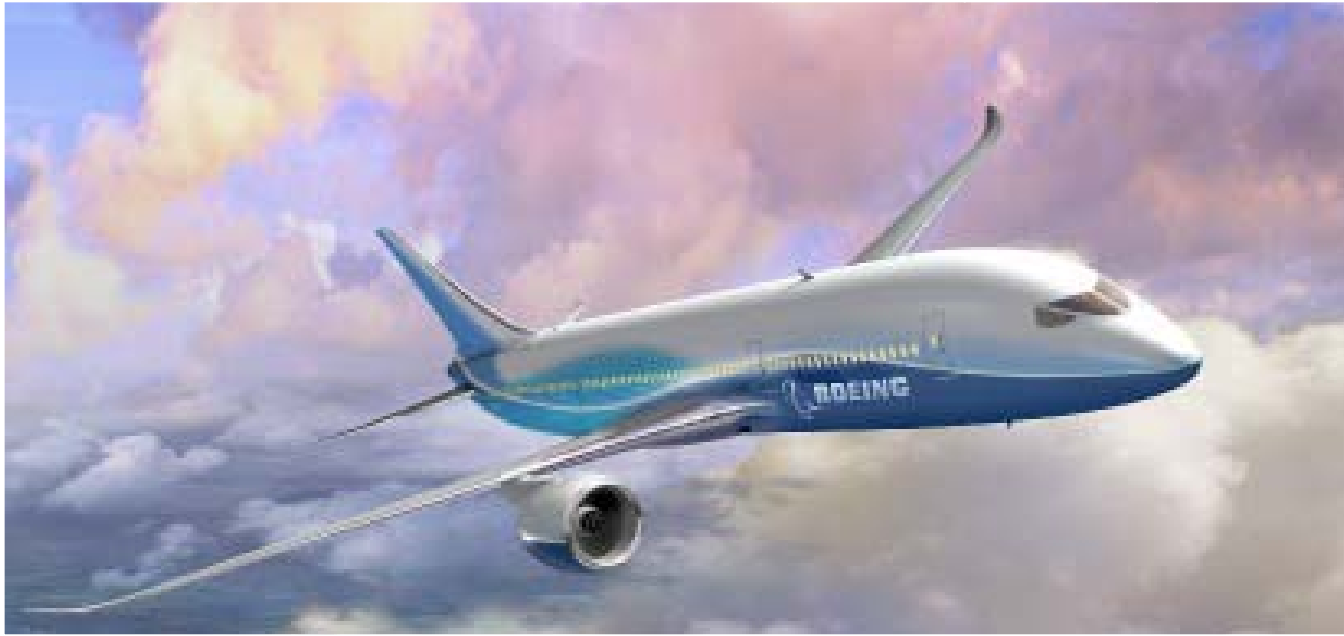
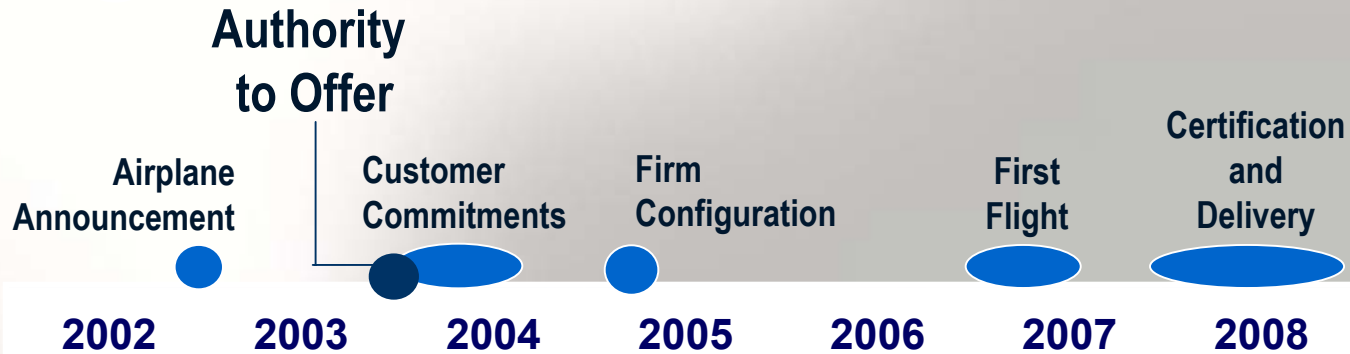
- Wider seats and aisles
- Quiet
- Improved humidity and cabin altitude
- Advanced environmental controls
- Superior passenger comfort

◆ Guiding principles:

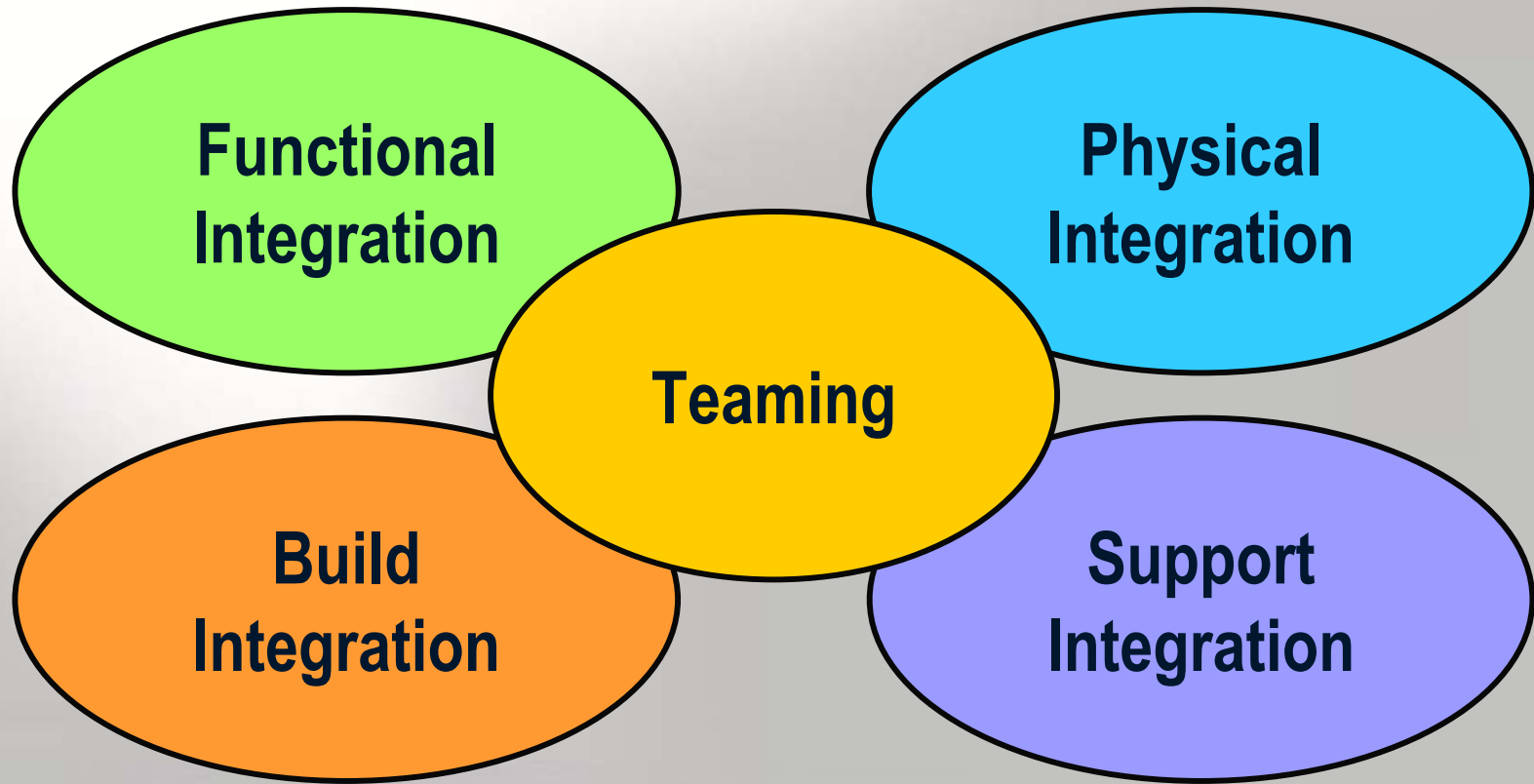
- Honor the passenger
- Enrich the flying experience



Program Schedule

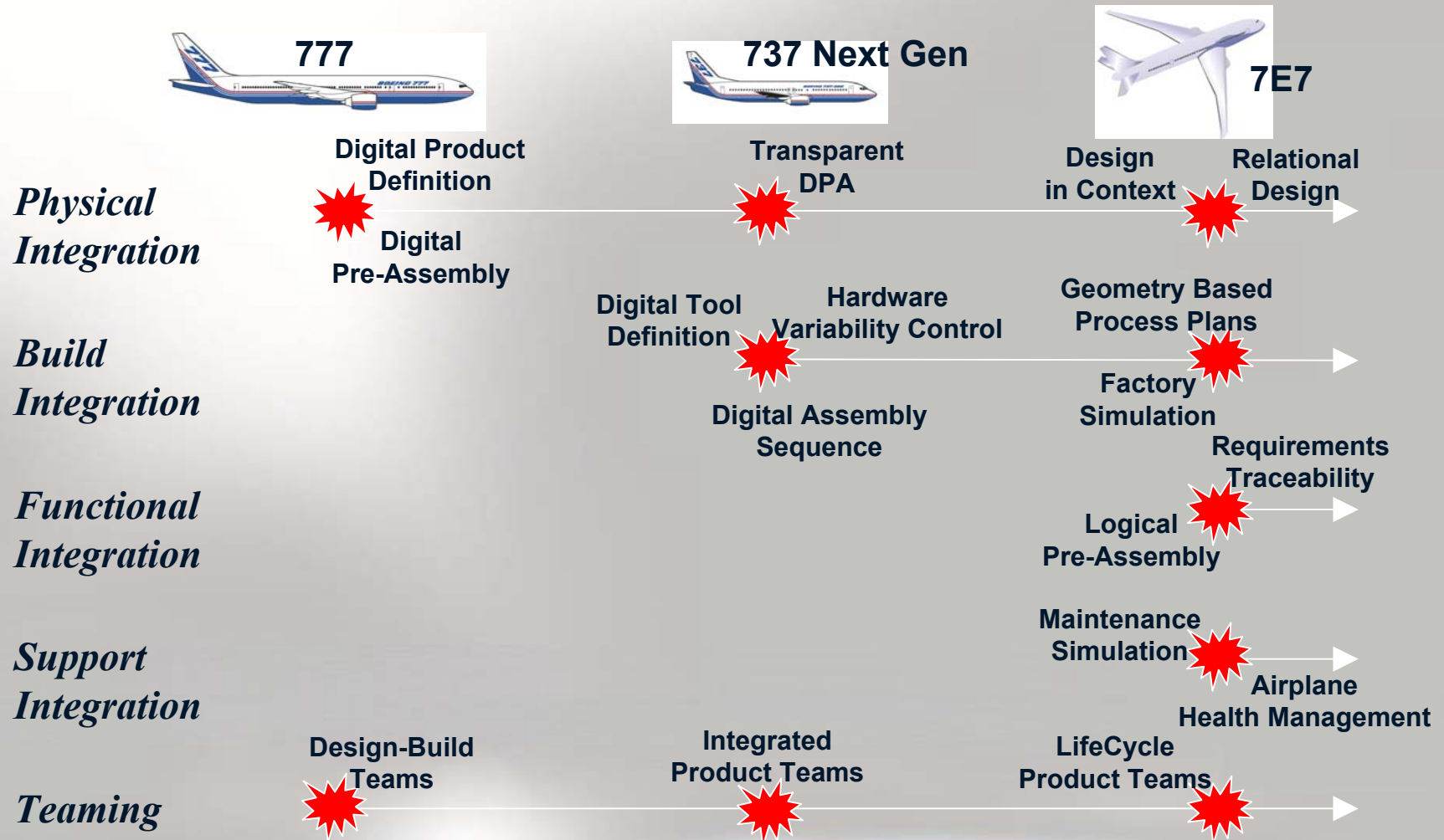


Virtual Product Development



Objective: Validate Product Requirements are Met Prior to Design Release

Virtual Product Development Evolution



Core Process & System Architecture

Support Integration

Airplane Sales Configuration

- Customer Option Definition and management
- Customer Specific Option Selections

Configurator

TeamCenter

Functional Design & Analysis

- Requirements
- Functional Architecture
- Function Definition
- System Definition
- Interface Management
- Behavior Analysis
- Transport Element Routing

DOORS
IGE-XAO

ENOVIA
SmarTeam

Physical Design & Analysis & Configuration Authority

- EBOM
- Part Definition
- Structural Analysis
- Tool Design
- Knowledge Based Design
- Standard Parts
- Dimensional Management
- Model Based Definition

CATIA V5

ENOVIA
LCA

Build Design & Analysis

- MBOM
- Plant Design
- Factory Flow Analysis
- Geometry Based Process Plan
- Manufacturing Simulation
- Producibility Analysis
- Ergonomic Analysis

DELMIA V5

ENOVIA
IPD

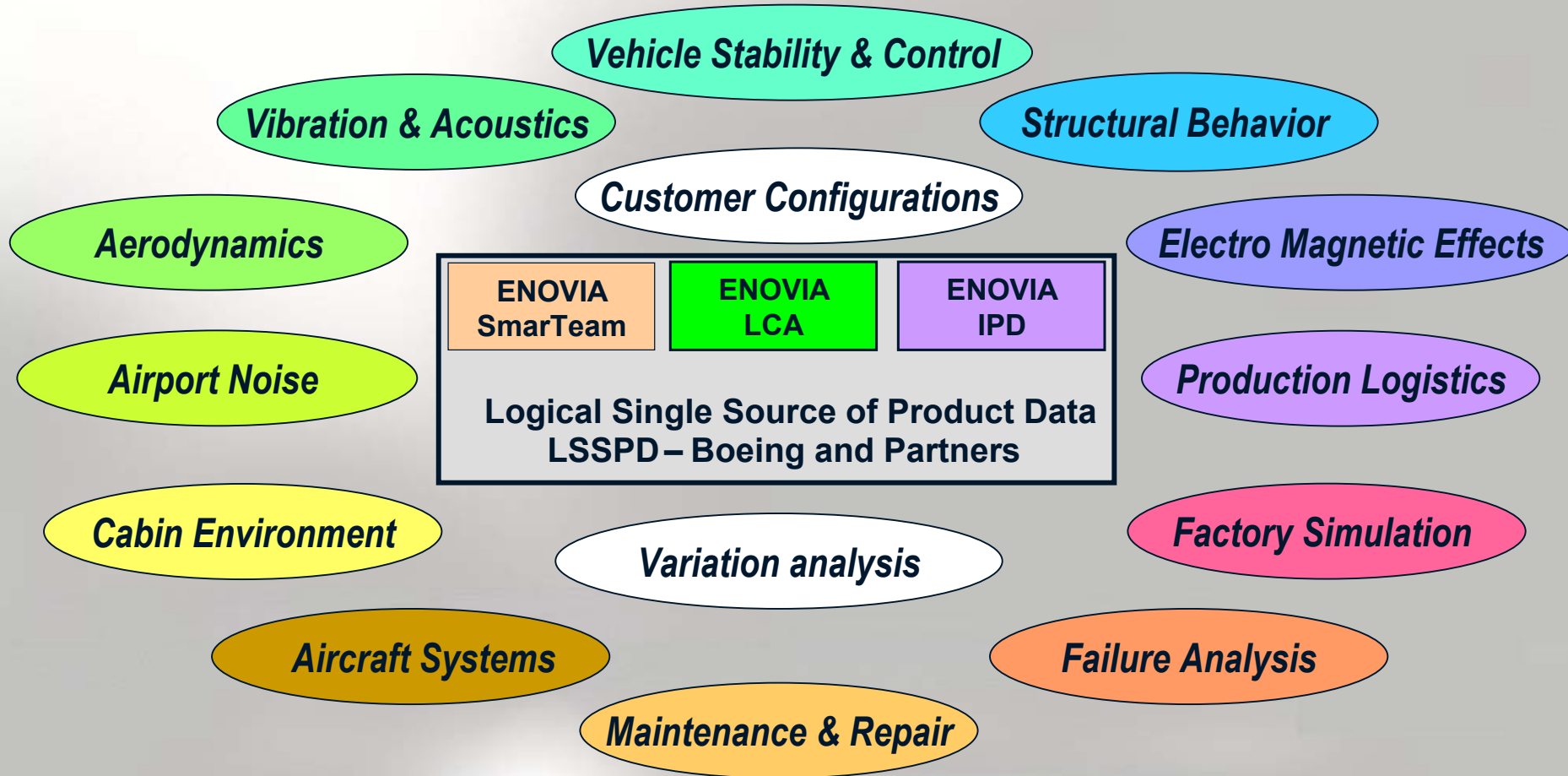
Shop Floor Integration Final Assembly

- Build-To Package Delivered to Factory Floor

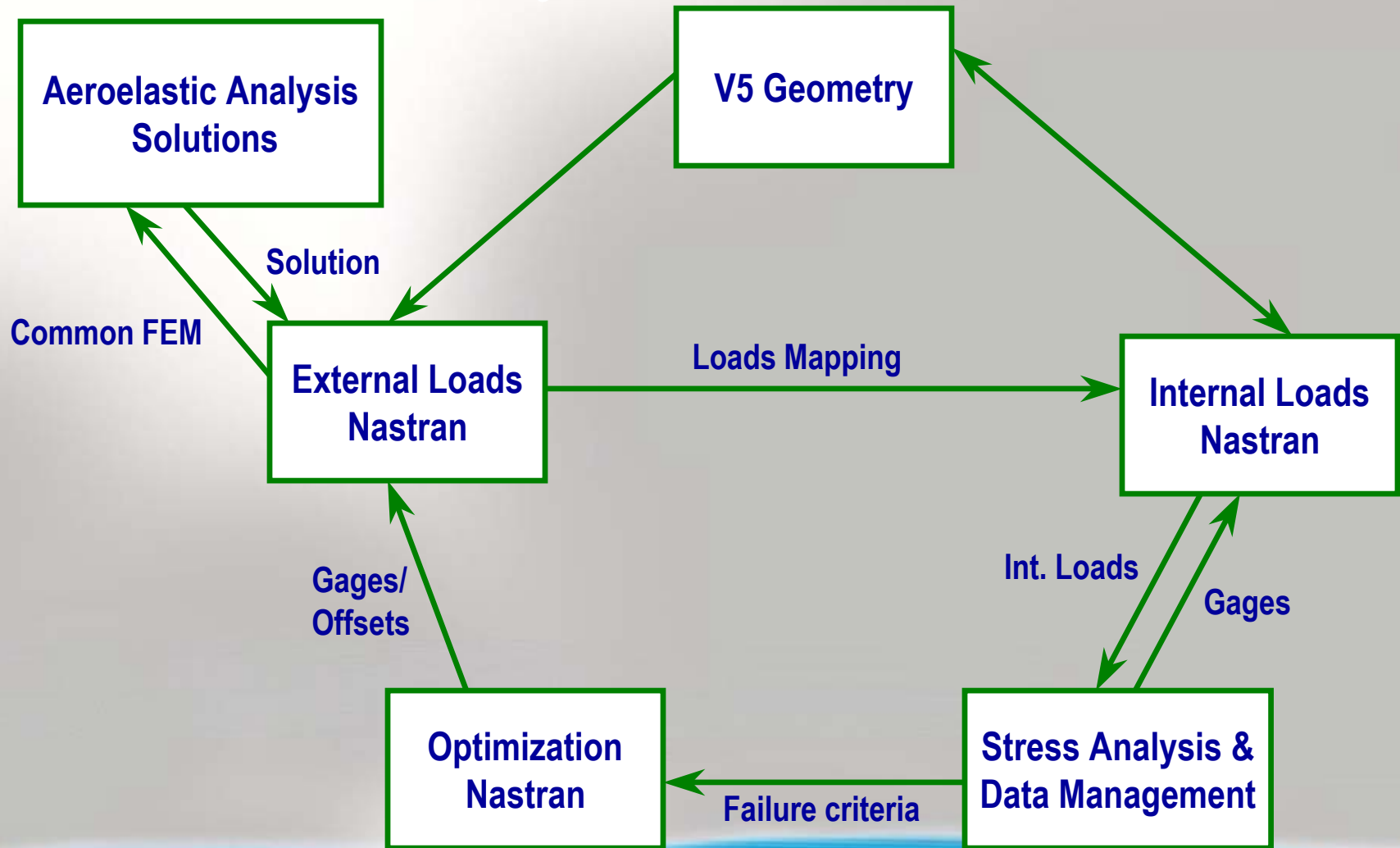
TBD

Logical Single Source of Product Data
LSSPD – Boeing and Partners

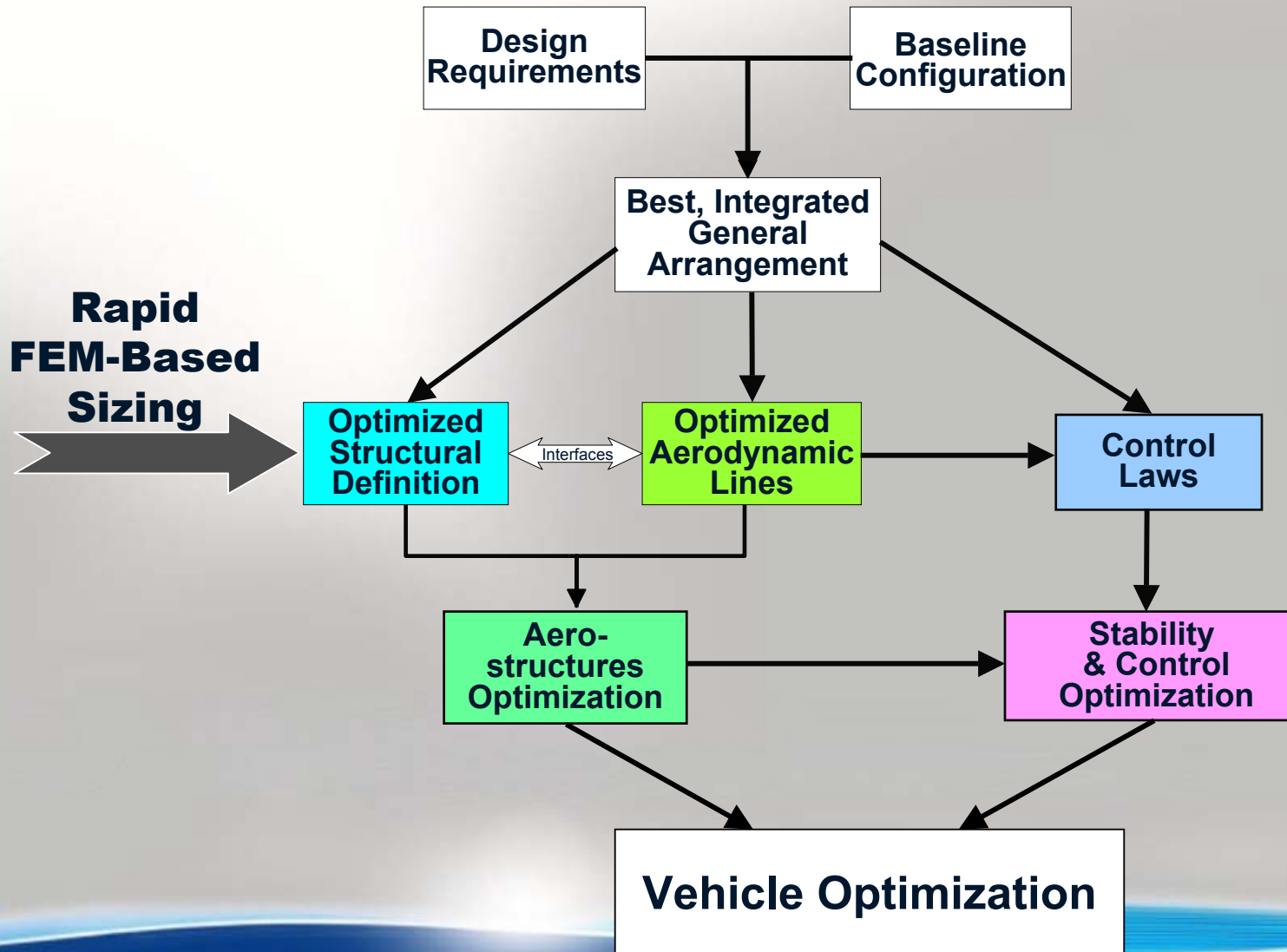
Single Source of Data Enables Integrated Virtual Product Development



Loads Analysis Process

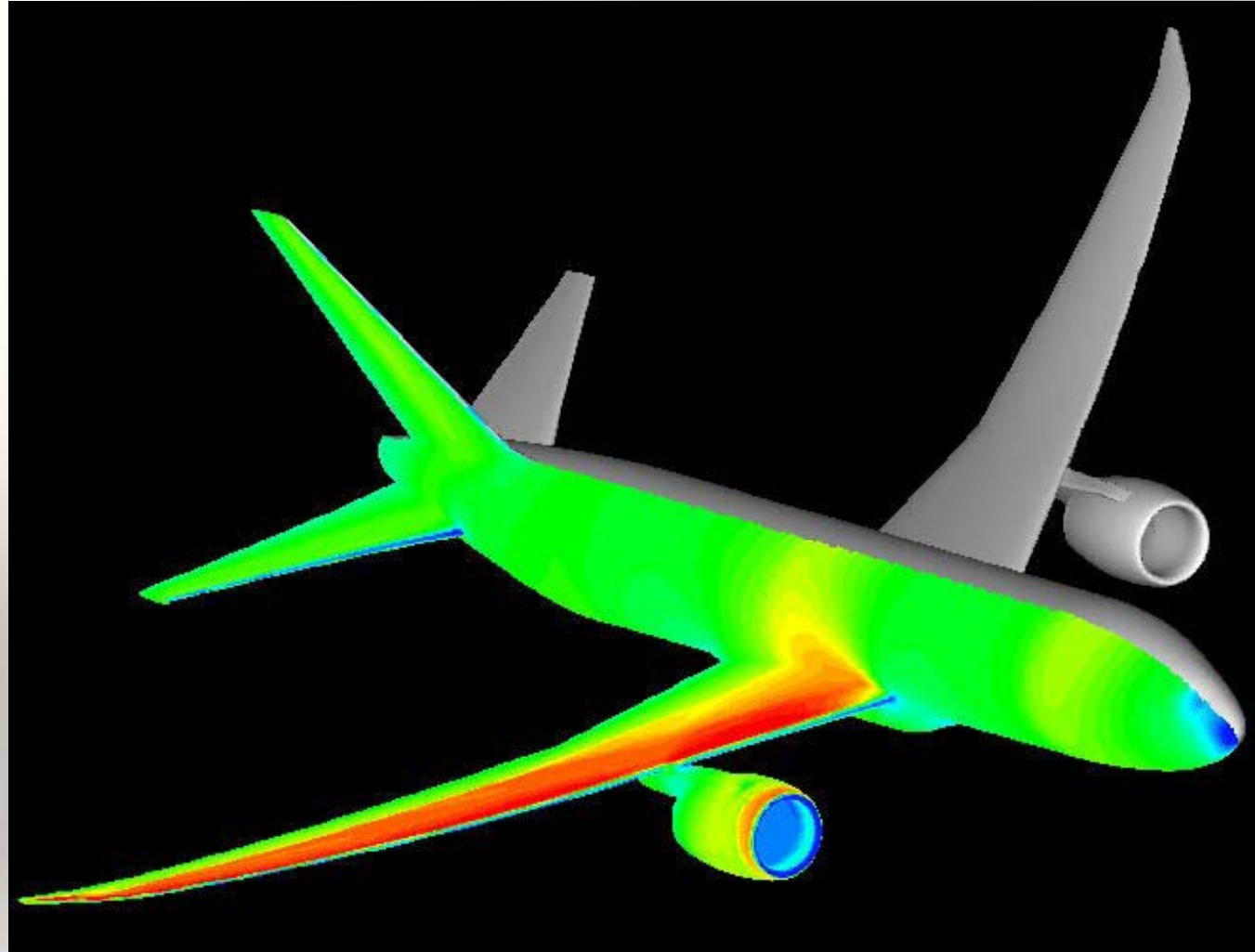


Integrated Lines, Loads and Laws

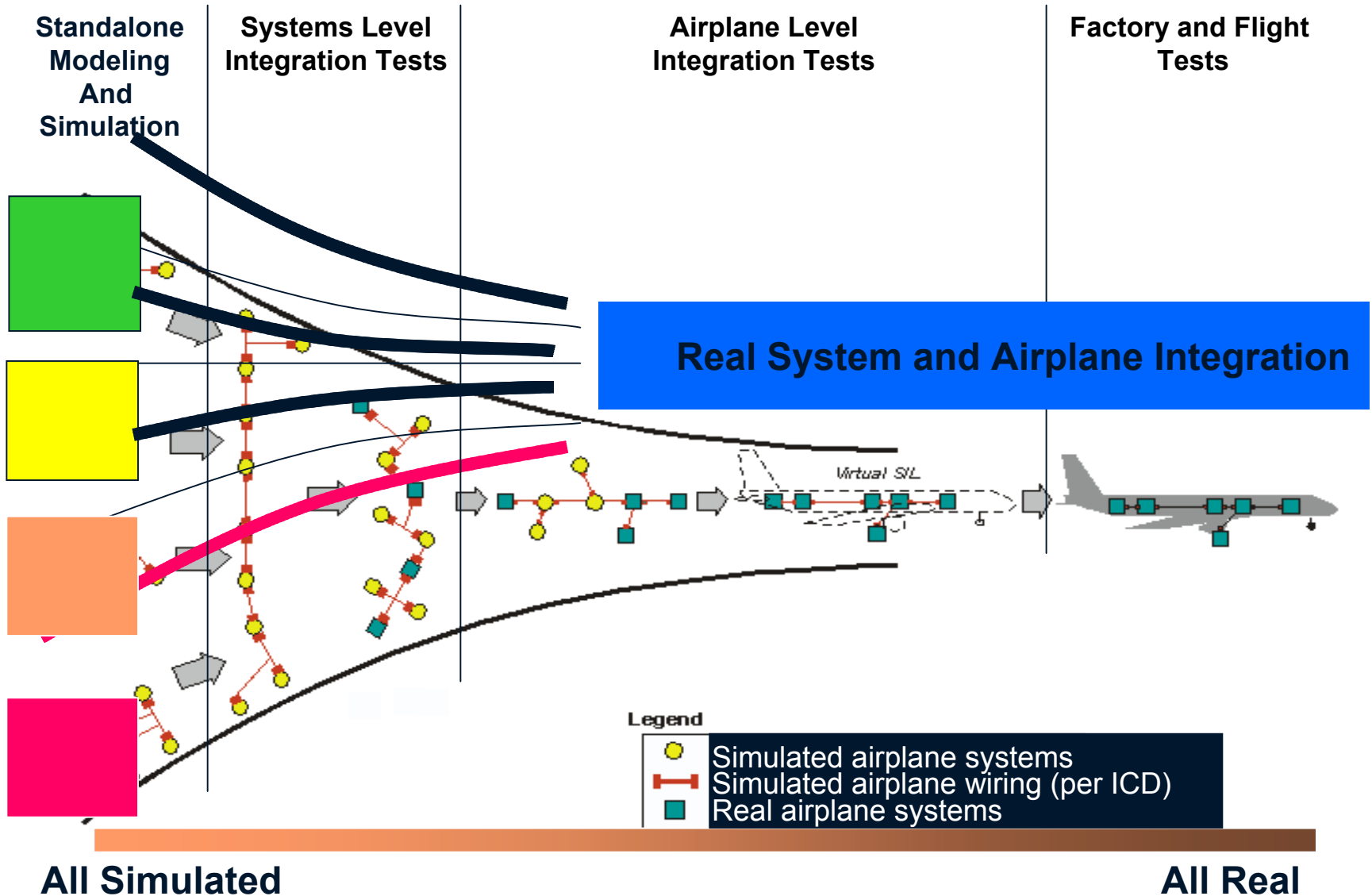


Advanced Aerodynamics

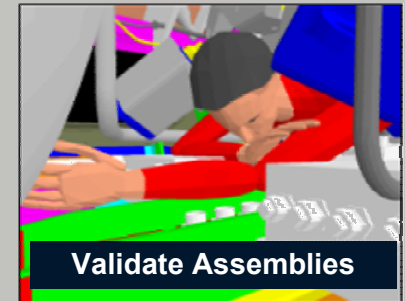
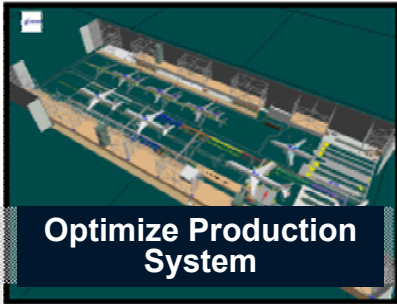
- ◆ Advanced computational fluid dynamics (CFD)
- ◆ Cray super computers and large PC clusters
- ◆ Wind tunnel testing



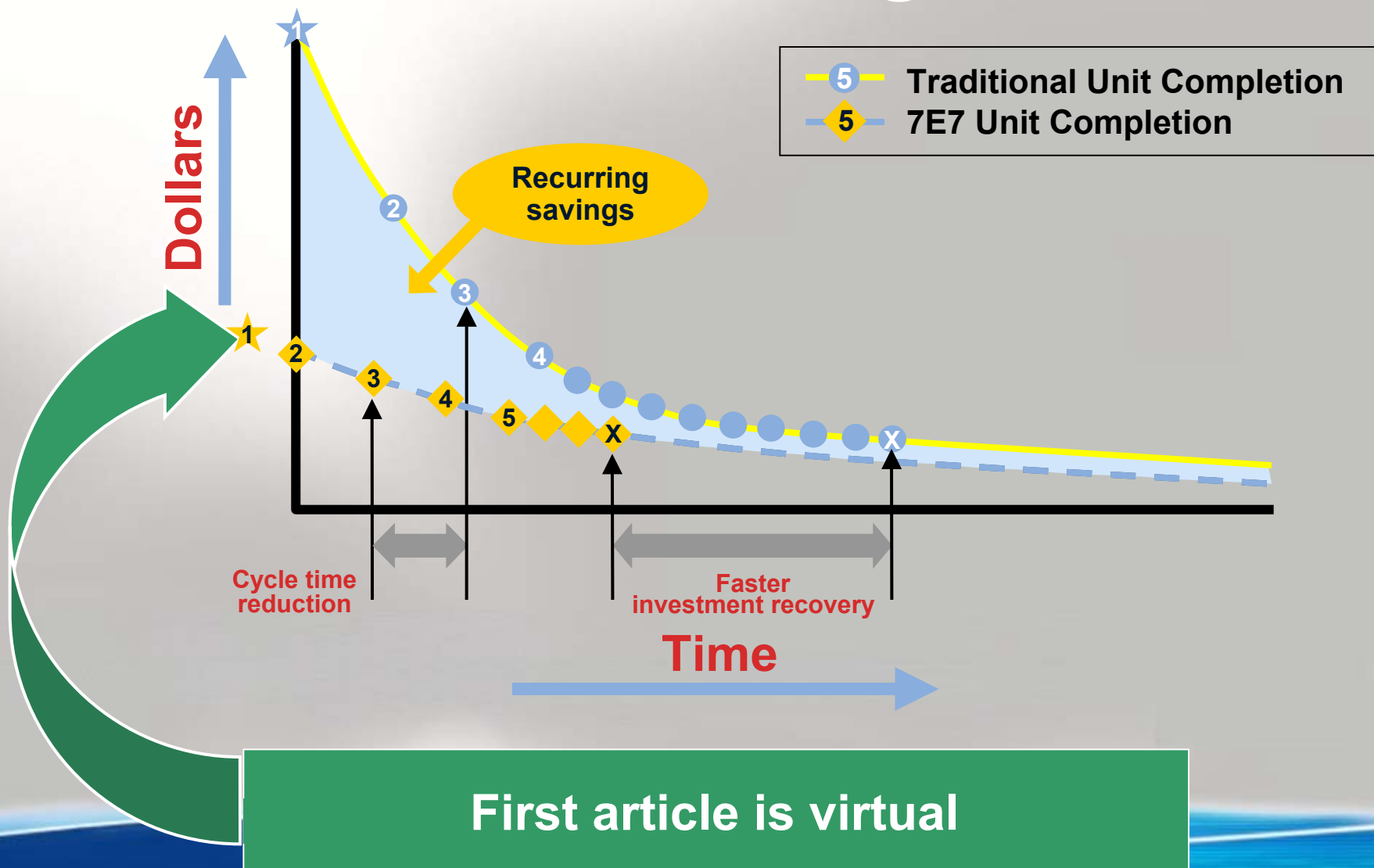
Virtual Systems Integration Approach



Virtual Build Integration



VPD Enabled Learning Curve



The Boeing 7E7 Dreamliner



A New Airplane for a New World